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Introducing the Tientsin Branch Office  
of the North China Electrical Industry

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INTRODUCING THE TIENSIN BRANCH OF THE  
NORTH CHINA ELECTRIC ENTERPRISE

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I. GENERAL INTRODUCTION

The Tientsin branch of the North China Electric Enterprise consists of 4 power plants. It has 563 technicians and employees and 1,211 workers, or a total of 1,773 persons. Its First Plant is the largest power plant in North China. This plant was started in November 1936 by China and Japan and opened in March 1938; it has two 15,000 kilowatt steam turbine-driven generators and two 80 ton per hour boilers. At the very beginning of its operation, the First Plant supplied 3,500 kilowatts, which was increased to 5,000 kilowatts in 1939, 9,000 kilowatts in 1940, 15,000 kilowatts in 1941, and 17,500 kilowatts in 1942. After adding a 70 ton per hour boiler it increased to a maximum output of 21,700 kilowatts of electric power in 1947. In 1949 the First Plant's monthly supply amounted to 17,710 kilowatts with a monthly coal consumption of 8,000 metric tons. In other words, it used up 0.65 kilogram of coal per one watt-hour of power; or it produced 1,700 watts per worker. The First Plant's installed power capacity is 30,000 kilowatts, but its constant generating capacity amounts to only 22,000 kilowatts because the equipment is old.

The Second Plant was originally owned by the British and belonged to the former Industrial Bureau in the British Concession. It opened in 1921 with mostly English made equipment. Its high-

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est monthly power supply was 2,813,290 watts during the Japanese occupation period, and 1,784,680 watts under the Kuomintang regime. Since the liberation, its monthly power supply has been 1,870,000 watts with an installed capacity of 5,000 kilowatts. The constant generating capacity is the same as the potential capacity ~~is the same as the potential capacity~~.

The Third Plant was the first electric plant in Tientsin. It operated in 1906 as an affiliate of the Belgian Electric Light and Electric Trolley Company. Its highest power output was 7,169,625 watts during the Japanese occupation period, 4,836,600 watts under the Kuomintang regime, and 4,459,150 since the liberation. Its installed capacity is 20,400 kilowatts, the constant generating capacity is only 10,500 kilowatts. Some of its equipment is now being overhauled; when it is fixed it will be able to supply an additional 5,000 kilowatts.

The Fourth Plant was previously a power house of the No. 7 Plant of the China Textile Company. Since the latter was completely ruined in the liberation battle of Tientsin, its power house was rented to the North China Electric Enterprise. Its highest monthly power capacity is 134,500 watts with an installed capacity of 5,000 kilowatts and a constant generating capacity of 3,500 kilowatts.

These four power plants supply an averaged 17,710 kilowatts monthly. After subtracting the electricity used by the plants themselves, the actual volume of power available to consumers amounts to 15,645 kilowatts, or 88.4 percent of the total generated power. Among the total power supply, 59 percent is

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used by industries, 39.1 percent for lighting, one percent for heating, and 0.9 percent for other purposes. The percentage distribution of industrial power consumptions is as follows:

#### DISTRIBUTION OF INDUSTRIAL CONSUMPTION OF ELECTRICITY

Textile	27.4 Percent
Flour Industry	13.2
Chemical Industry	21.0
Metallurgy	7.0
Machine Building	3.1
Electric Appliance Industry	2.8
Communications	4.3
Food Industry	1.8
Printing	1.0
Woodwork	0.7

#### II. ELECTRICAL GENERATION AND ELECTRICAL EQUIPMENT

The four plants of the Tientsin Branch of the North China Electric Enterprise are equipped with 22 boilers of sizes ranging from 8 to 80 tons per hour, 11 units of steam turbine-driven generators of capacities ranging from 1,000 to 15,000 kilowatts. The electrical frequency is 50 cycles and terminal voltage is 5,500 volts.

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Transmission lines are operating at 77,000 volts. The transmission networks installed in Tientsin, Tang-shan, and Peking constitute a triangle system of electric supply, controlled by the Peking network. Secondary transmission lines in the City of Tientsin operate at 22,000 volts. General transmission voltage is 5,500 volts. Transmission voltage for supplying general consumers operates at 380-220 volts [sic]. There are 7 transmission stations in the city, with a total capacity of 251,000 kilovolt amperes. There are 245,040 meters of 77,000-volt high tension power lines and 505,500 meters of 380-220-volt power lines installed above ground and 80,800 meters of underground power lines.

For boilers and generators see the following two tables:

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## BOILER FACILITIES IN TIENTSIN POWER PLANTS

<u>Plant</u>	<u>Type of Boiler</u>	<u>Number of Boilers</u>	<u>Evaporation (Ton per hour)</u>	<u>Steam-pressure (kilograms per centimeter)</u>	<u>Temperature (Centigrade)</u>
No. 1	Pulverized-coal type	2	80	32	420
	Lancashire type	1	70	32	420
No. 2	Lancashire LTM	2	13.6	14.4	342
	Lancashire WIF	2	9.1	14.4	242
No. 3	Scotch type	8	8.0	14	350
	Lancashire	4	12	14	375
No. 4	Lancashire	3	22	23	350

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## STEAM TURBINES AND GENERATORS IN TIENTSIN'S POWER PLANTS

<u>Plant</u>	<u>Type of Turbine</u>	<u>Number of Turbines</u>	<u>Capacity per Turbine (kilowatt)</u>	<u>Steam Pressure</u>	<u>Temperature</u>	<u>Speed (R.P.M.)</u>	<u>Generators (Kilovolt/amp.)</u>
No. 1	Curtis-Rateau	2	15,000	30	400	3,000	18,750
No. 2	Curtis-Rateau	2	2,500	14	320	3,000	3,125
	Rateau	2	1,000	14	320	3,000	1,250
No. 3	Curtis-Parsons	2	3,000	17.5	325	3,000	
	Curtis-Parsons	1	3,600	17.5	325	3,000	
	Shlyde	1	5,800	12.5	325	3,000	
No. 4	British Pu-rh-shih [Transliteration]	1	5,000	21	330	3,000	5,000

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## III. PRESENT DIFFICULTIES

1. Theft of Electricity

Theft presents a very serious problem to Tientsin power plants; the monthly theft loss is estimated to be at least one million watts, or 6 percent of the total power output. It amounted to as high as to 6,553,140 watts or 50 percent of the total power output in February 1949. What a huge amount! This interferes greatly with industrial users and with the general public. The North China Electrical Enterprise launched a campaign to eliminate theft by urging the violators to register for confession and by giving rewards to persons who report violators. As a result, a thousand or more thieves, registered and made confessions. However, electricity stealing has not been completely eliminated and the problem still remains to be solved as soon as possible.

2. Insufficient Electric Supply

In order to meet the new circumstances that surround China, we must develop our industry on a gigantic scale. Hence, there will be a great and ever increasing demand for electrical power. Electric supply in Tientsin is apparently far from sufficient; 89.3 percent of the generated power supplied by the North China Electrical Enterprise is consumed by industrial users, and only 20.7 percent is available for non-industrial users. Secondly, the highest monthly generating capacity of the electric power plants is 41,000 kilowatts while the present load is 36,600 kilowatts.

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This means there is a monthly potential capacity of 5,000 kilowatts. However, the power plants use 12 percent of the total supply, and there is a constant loss of electric power through theft. At present, Tientsin is already short 20,000 kilowatts of electric power. Third, the useful age of most of the electric generators is rapidly running out, and they can hardly be kept in good condition owing to the present round-the-clock operation. In view of all these difficulties, it is obvious that a proper solution must be found for the present shortage of electric power in Tientsin.